



3. The Examiner rejected claims 47-50, 56-59, 61, and 63-67 (the “first set of Claims”) of the Patent Application in an Office Action mailed December 13, 2005, based, in whole or in part, on U.S. Patent Application Publication No. 2004/0261993 by Philip D. Nguyen (“*Nguyen I*”) that was filed on June 27, 2003. In that same Office Action, the Examiner also rejected claims 47-50 and 55-67 (the “second set of Claims”) of the Patent Application based, in whole or in part, on U.S. Patent Application Publication No. 2004/0261999 by Philip D. Nguyen (“*Nguyen II*”) that was filed on June 27, 2003.

4. Sometime prior to June 27, 2003, we, the undersigned, developed an understanding and appreciation of the subject matter of at least the first and second sets of Claims and developed one or more working versions of the subject matter of at least the first and second sets of Claims as evidenced by an invention disclosure form attached as Exhibit A, which is described below.

5. As an example, we, the undersigned, reduced to practice the subject matter of at least the first and second sets of Claims as evidenced by attached Exhibit A. The methods shown in Exhibit A include: providing a fluid comprising a viscosified fluid, a fluid loss control additive, and a bridging agent comprising a degradable material; forming a self-degrading filter cake comprising the bridging agent; and permitting the filter cake to self-degrade. Exhibit A includes experimental results, which with the accompanying textual description, show a reduction to practice of at least the subject matter of the first and second sets of Claims.

6. The acts referred to in paragraphs 4 and 5 were carried out in the United States prior to June 27, 2003.

7. We hereby declare that all statements made herein and of our knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Bradley L. Todd  
Bradley L. Todd

Apr. 4, 2006  
Date

Trinidad Munoz, Jr.  
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April 4, 2006  
Date

# HALLIBURTON ENERGY SERVICES GROUP

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## INVENTION DISCLOSURE

P.M. No. \_\_\_\_\_

TITLE: PLA Bridging Particles for Drill-in Fluids

MAR 13 2003

2003-IP-010228

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Description of Invention: Give brief description of invention, and where possible a sketch. Do not write on back of this sheet. If additional space is necessary, use additional disclosure sheets (R&S 2311) and number consecutively. Sign and date each sheet and have each witnessed. Witnesses must be persons capable of understanding invention. If invented prior to date on this sheet, give full details - date, to whom disclosed, identify drawings, if any, etc. If used in the field, specify for what company and designate well and date.

One of the major problems with the productivity in horizontal wells, especially open hole completions in high permeability sandstone, is the clean up of the filter cake from the face of the formation. Many operators use special "drill-in" fluids to try to minimize this problem. A drill-in fluid is designed to form a fast and efficient filter cake to minimize leak off and damage. The fluids are usually made up of calcium carbonate bridging particles, starch fluid loss materials and xanthan for viscosity. Acid has been the fluid of choice for cleaning up the filter cakes from these fluids. In recent years, many operators have started to object to the use of acid because of the suspected damage to sand control screens as a result of corrosion. Oxidizing breakers and enzyme breaker have been used, but they only address the polymers and not the bridging particles. Salt based system can be used in some cases but are very limited to the amount they can be weighted up.

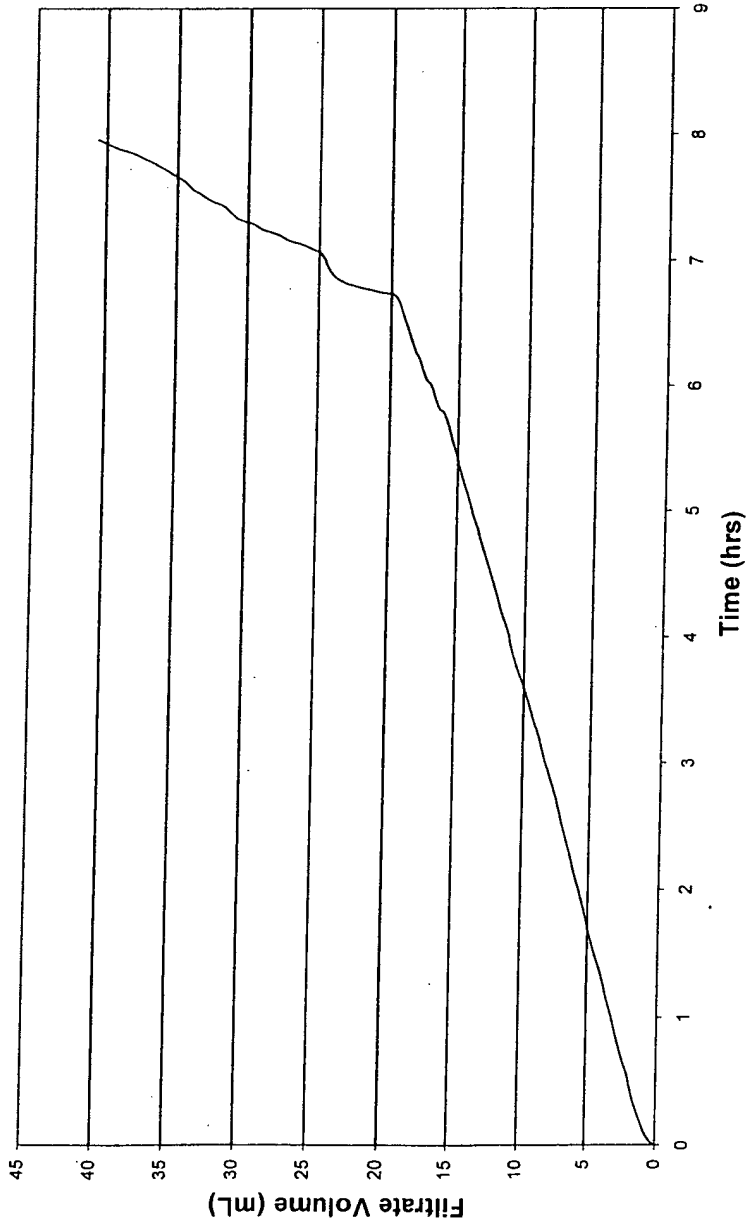
What is needed is a system that contains a bridging particle that can be removed with a fairly non-reactive fluid, can be placed in any brine and can be weighted up.

The current invention involves the use of Polylactic acid (PLA) as a bridging material in a drill-in fluid. The attractive feature of this material is that PLA slowly hydrolyzes in water even at elevated temperatures to yield lactic acid which is readily soluble in water. As a result, the obvious fluid of choice for cleaning up the filter cakes from these fluids is water as opposed to harsh mineral acids used to clean up calcium carbonate drill-in fluids. Another advantage of this material is the produced lactic acid also aids in the clean up of the starch and xanthan.

drill-in fluid filter cake can be

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